

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of Civil Engineering
B. Tech. (3rd Semester) Major Examination (Odd Semester) 2019-20

Entry No. _____

Date: 16.12.2019

Course Title: Strength of Materials

Time Allowed: 3.0 Hours

Total Number of Pages: [03]

Total Number of Questions: [06]

Course Code: CEP 2021

Max Marks: [50]

Instructions / NOTE

- i. Attempt All Questions.
- ii. Support your answer with neat freehand sketches/diagrams, wherever appropriate.
- iii. Assume an appropriate data / information, wherever necessary / missing.

Q1. Write short notes on the followings.

- | | |
|----------------------------------|----------|
| a) Point of contraflexure | 01 [CO1] |
| b) Slenderness ratio | 01 [CO2] |
| c) Section modulus of a section | 01 [CO1] |
| d) Torsional moment | 01 [CO3] |
| e) Euler's buckling load formula | 01 [CO4] |

Q2. Differentiate between.

- | | |
|---|----------|
| a) Behavior of fixed and simple support | 02 [CO1] |
| b) Upper and lower yielding points in a stress-strain graph for mild steel. | 02 [CO1] |
| c) Short and slender column | 02 [CO4] |
| d) Overhang and cantilever beams in terms of bending moment diagram | 02 [CO3] |
| e) Young modulus of elasticity and modulus of rigidity. | 02 [CO4] |

Q3. (a) Differentiate ductile and elastic materials in terms of stress-strain diagram.

04 [CO4]

(b) Calculate support reactions for the beam shown in Figure 1.

03 [CO3]

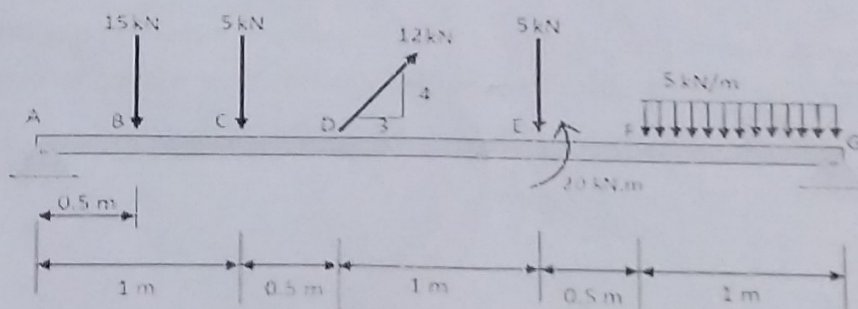


Figure 1

Q4. (a) Draw the shear force and bending diagrams for the beam shown in Figure 2.

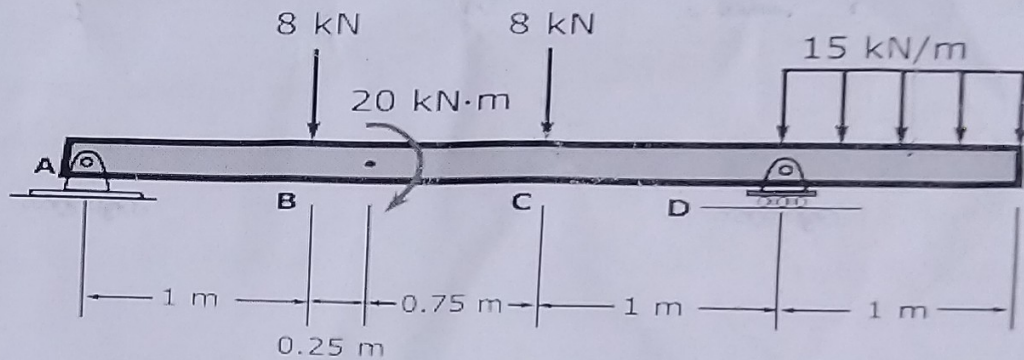


Figure 2

05 [CO2]

(b) Discuss the various assumptions taken in the simple bending theory.

03 [CO3]

Q.5 (a) Calculate the moment of inertia of the section shown in Figure 3 w.r.t. a horizontal axis passing through its base.

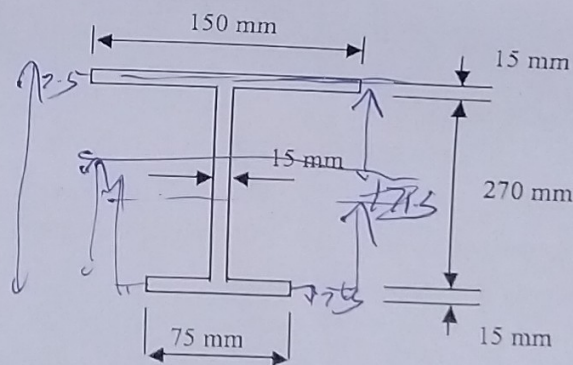


Figure 3

05 [CO3]

(b) A point in a strained material is subjected to two mutually perpendicular tensile stresses of 200 MPa and 100 MPa. Determine the intensities of normal, shear and resultant stresses on a plane inclined at 30° with the axis of minor tensile stress.

05 [CO4]

- Q.6 (a) A beam of rectangular section supports a load of 20 kN uniformly distributed over a span of 3.6 m. If depth of the beam section is twice the width and maximum stress is not to exceed 7 MPa. Find the dimensions of the beam section.

04 [CO4]

- (b) Determine using Macaulay's method the deflections at 'C' and 'D' in the beam shown in Figure 4.

06 [CO3]

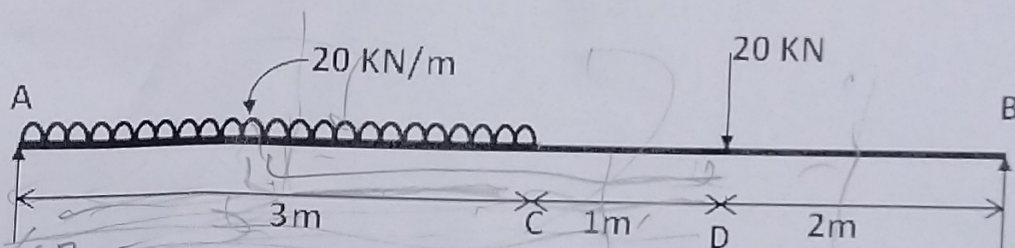


Figure 4

CO	Questions Mapping	Total Marks	Total No. of students
CO1	Q1(a), 1(c), 2(a), 2(b)	06	60
CO2	Q1(b), Q4(a)	06	60
CO3	Q1(d), Q2(d), Q3(b), Q4(b), Q5(a), Q6(b)	20	60
CO4	Q1(e), Q2(c), Q2(e), Q3(a), Q5(b), Q6(a)	18	60